CLAIMS

1. An electrolytic processing apparatus comprising:

a substrate holder for holding a substrate;

an electrode base provided with a electrode member for contact with the substrate, held by the substrate holder, in the presence of a liquid to effect processing of the substrate; and

a support base for floatingly supporting the electrode base by a floating mechanism.

2. The electrolytic processing apparatus according to claim 1, further comprising:

a stopper for limiting the movements of the electrode base in a direction away from the support base and in a direction parallel to the support base.

3. The electrolytic processing apparatus according to claim 1 or 2, wherein the floating mechanism supports the electrode base floatingly by an elastic body interposed between the electrode base and the support base.

4. The electrolytic processing apparatus according to claim 1 or 2, wherein the floating mechanism supports the electrode base by the pressure of a fluid enclosed within a pressure chamber formed between the electrode base and the support base, and surrounded by an elastic membrane.

5. The electrolytic processing apparatus according to claim 4, wherein the fluid at a predetermined pressure is supplied into the pressure chamber.

6. The electrolytic processing apparatus according to claim 1, wherein a plurality of electrodes is fixed on the electrode base.

7. The electrolytic processing apparatus according to claim 1, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

8. An electrolytic processing apparatus comprising:

a substrate holder for holding a substrate;

an electrode member for contact with the substrate, held by the substrate holder, in the presence of a liquid to effect processing of the substrate; and

an electrode support base for floatingly supporting the electrode member by a floating mechanism.

9. The electrolytic processing apparatus according to claim 8, wherein the electrode member is provided in numbers and each electrode member is supported floatingly by an independent floating mechanism.

10. The electrolytic processing apparatus according to claim 8 or 9, further comprising:

a stopper for limiting the movements of the electrode member in a direction away from the electrode support base and in a direction parallel to the electrode support base.

11. The electrolytic processing apparatus according to claim 8 or 9, wherein the floating mechanism supports the electrode member floatingly by an elastic body interposed between the electrode member and the electrode support base.

12. The electrolytic processing apparatus according to claim 8 or 9, wherein the floating mechanism supports the electrode member by the pressure of a fluid enclosed within a pressure chamber formed between the electrode member and the electrode support base, and surrounded by an elastic membrane.

13. The electrolytic processing apparatus according to claim 12, wherein the fluid at a predetermined pressure is supplied into the pressure chamber.

14. The electrolytic processing apparatus according to claim 8, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

15. An electrolytic processing apparatus comprising:

a substrate holder for holding a substrate;

a plurality of electrode members for contact with the substrate, held by the substrate holder, in the presence of a liquid to effect processing of the substrate;

a floating mechanism for floatingly supporting the electrode members; and

an adjustment member for floating a part of the plurality of electrode members selectively or changing the elasticity, which is generated by the floating mechanism, of a part of the plurality of electrode members.

16. The electrolytic processing apparatus according to claim 15, wherein the adjustment member is provided to a feeding electrode member for feeding electricity to the substrate.

17. The electrolytic processing apparatus according to claim 15, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

18. An electrolytic processing apparatus comprising:

a substrate holder for holding a substrate;

an electrode member for contact with the substrate, held by the substrate holder, in the presence of a liquid to effect processing of the substrate;

a drive mechanism for moving the substrate, held by the substrate holder, and the electrode member relative to each other; and

a guide member disposed around the substrate holder and having an outwardly-extending tapered guide surface which, upon the relative movement between the substrate and the electrode member, comes into contact with the upper surface of the electrode member and guides the electrode member to a contact position at which the electrode member makes contact with the substrate.

19. The electrolytic processing apparatus according to claim 18, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

20. An electrolytic processing apparatus comprising:

a substrate holder for holding a substrate;

an electrode member for contact with the substrate, held by the substrate holder, in the presence of a liquid to effect processing of the substrate;

a drive mechanism for moving the substrate, held by the substrate holder, and the electrode member relative to each other; and

a guide member disposed around the substrate holder and having a contact surface which comes into contact with the electrode member outside the substrate;

wherein the contact area of the electrode member with the guide member and the substrate is constant.

21. The electrolytic processing apparatus according to claim 20, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

22. The electrolytic processing apparatus according to claim 20 or 21, wherein the electrode member is provided in numbers, and the outer shape of the guide member is similar to the outer shape defined by the electrode members which are in contact with the substrate held by the substrate holder.

23. An electrolytic processing method comprising:

bringing a substrate into contact with an electrode member mounted on a floatingly-supported electrode base in the presence of a liquid while moving the substrate and the electrode member relative to each other, thereby processing the surface of the substrate.

24. The electrolytic processing method according to claim 23, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

25. An electrolytic processing method comprising:

bringing a substrate into contact with a floatingly-supported electrode member in the presence of a liquid while moving the substrate and the electrode member relative to each other, thereby processing the surface of the substrate.

26. The electrolytic processing method according to claim 25, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

27. An electrolytic processing method comprising:

bringing a substrate, held by a substrate holder, into contact with an electrode member in the presence of a liquid while moving the substrate and the electrode member relative to each other; and

bringing the upper surface of the electrode member into contact with a guide surface of a guide member disposed around the substrate to guide the electrode member to a contact position at which the electrode member makes contact with the substrate held by the substrate holder, during the relative movement between the substrate and the electrode member, thereby processing the surface of the substrate.

28. The electrolytic processing method according to claim 27, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

29. An electrolytic processing method comprising:

bringing a substrate, held by a substrate holder, into contact with an electrode member in the presence of a liquid while moving the substrate and the electrode member relative to each other; and

bringing the electrode member into contact with a contact surface of a guide member, disposed around the substrate holder, such that the contact area of the electrode member with the contact surface and the substrate is constant.

30. The electrolytic processing method according to claim 29, wherein the electrode member includes an electrode to be connected to a power source, and an ion exchanger or a scrubbing member covering the surface of the electrode.

31. The electrolytic processing method according to claim 29 or 30, wherein the electrode member is provided in numbers, and the outer shape of the guide member is similar to the outer shape defined by the electrode members which are in contact with the substrate held by the substrate holder.

32. An electrolytic processing apparatus comprising:

an electrode section provided with an electrode member including an electrode and an ion exchanger covering a surface of the electrode;

a holder for holding a workpiece, capable of bringing the workpiece close to or into contact with the ion exchanger of the electrode member; and

a power source to be connected to the electrode of the electrode member of the electrode section;

wherein at least an edge portion of the surface, facing the workpiece, of the electrode is made round.

33. An electrolytic processing apparatus comprising:

an electrode section provided with an electrode member including an electrode and an ion exchanger covering a surface of the electrode;

a holder for holding a workpiece, capable of bringing the workpiece close to or into contact with the ion exchanger of the electrode member; and

a power source to be connected to the electrode of the electrode member of the electrode section;

wherein an insulator is interposed between the ion exchanger and the surface, facing the workpiece, of the electrode.

34. The electrolytic processing apparatus according to claim 33, wherein the electrode and the insulator are formed integrally.

35. An electrolytic processing apparatus comprising:

an electrode section provided with an electrode member including an electrode and an ion exchanger covering a surface of the electrode;

a holder for holding a workpiece, capable of bringing the workpiece close to or into contact with the ion exchanger of the electrode member; and

a power source to be connected to the electrode of the electrode member of the electrode section;

wherein the ion exchanger comprises an ion exchanger to be close to or in contact with the workpiece, and at least one other ion exchanger, and the electrode and the ion exchanger to be close to or in contact with the workpiece are at least partly insulated from each other by an insulator.

36. The electrolytic processing apparatus according to claim 35, wherein the insulator is interposed between an edge portion of the surface, facing the workpiece, of the electrode and the ion exchanger to be close to or in contact with the workpiece.

37. The electrolytic processing apparatus according to claim 35 or 36, wherein the electrode and the insulator are formed integrally.

38. An electrolytic processing apparatus comprising:

an electrode section provided with an electrode member including an electrode and an ion exchanger covering a surface of the electrode;

a holder for holding a workpiece, capable of bringing the workpiece close to or into contact with the ion exchanger of the electrode member; and

a power source to be connected to the electrode of the electrode member of the electrode section;

wherein the ion exchanger comprises an ion exchanger to be close to or in contact with the workpiece, and at least one other ion exchanger, and the ion exchanger to be close to or in contact with the workpiece and the at least one other ion exchanger are at least partly insulated from each other by an insulator.

39. The electrolytic processing apparatus according to claim 38, wherein the at least one other ion exchanger, except its surface facing the workpiece, is surrounded integrally by the insulator.